

Denny's  
Imperial  
Gas Machine  
New York.

Denby  
Impress  
Machin  
New York

# DENNY BROTHERS

MECHANICAL ENGINEERS

SOLE PROPRIETORS OF

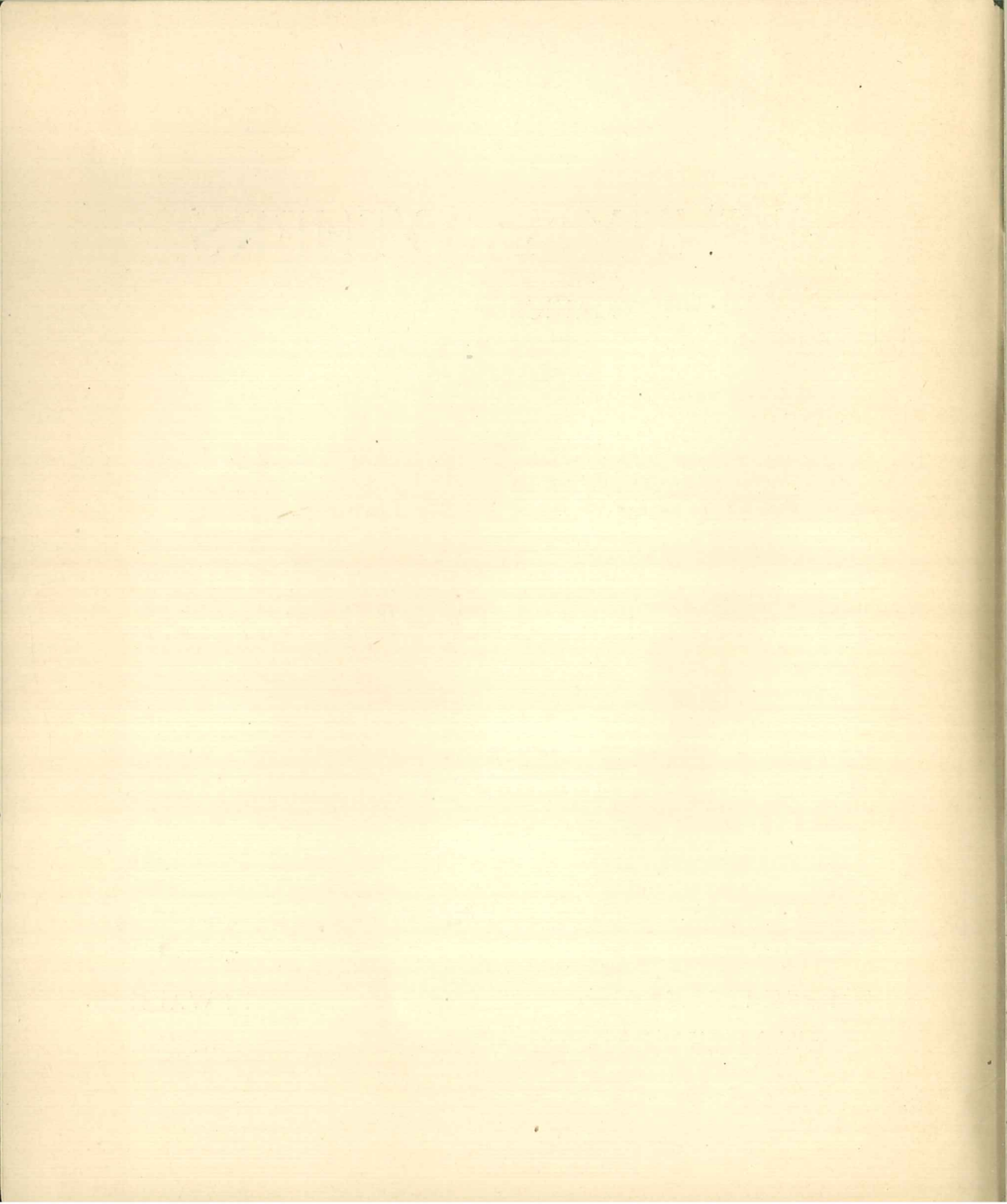
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## DENNY'S IMPERIAL GAS MACHINE

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PRINCIPAL OFFICE  
36 PARK PLACE  
NEW YORK

WORKS AT  
NEWARK  
N. J.





REFERENCES to parties using  
our Machine in any part of the  
United States will be furnished  
on application.

# IMPERIAL GAS MACHINE.

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THE IMPERIAL GAS MACHINE is an Automatic Gas-Making Apparatus, designed for supplying Residences, Hotels, Factories, Mills, Churches, Colleges, Public Buildings, or groups of buildings, with a safe and cheap illuminating Gas.

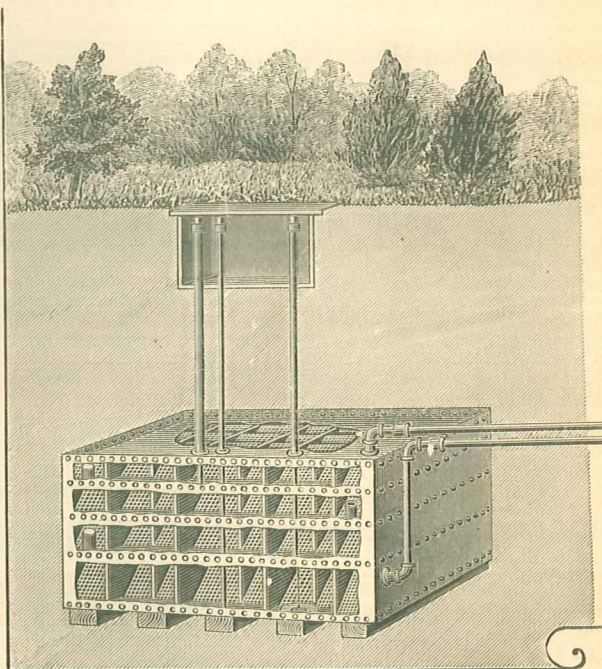
The machine is *simple, durable* and *reliable*, being made of heavy, non-corrosive metals, well put together, and requiring no more care or attention than is necessary in filling, cleaning and trimming one kerosene lamp.

THE GAS IS MADE by impregnating common air with the vapor of Gasolene. It is then conducted through iron pipes and ornamental fixtures, the same as ordinary street gas, and in burning through either the open or Argand burners, it gives a clear, bright light, fully equal to the best coal gas.

THE COST OF THE GAS varies, according to the price of Gasolene, from seventy-five cents to one dollar per 1,000 cubic feet.

NO ARTIFICIAL HEAT is used in making the gas, and buildings lighted with it are insured by all the American and British Insurance Companies at the same rates as would be charged if coal gas were used.

*The material from which the Gas is made* is known commercially as Gasolene. It is one of the



GENERATOR BURIED IN THE EARTH AT ANY DESIRED DISTANCE FROM THE BUILDING.



lighter products of petroleum, and can be obtained in large or small quantities from oil refiners or dealers in all our large cities. The price of Gasolene for many years has not exceeded fifteen cents per gallon.

## CONSTRUCTION AND DURABILITY.

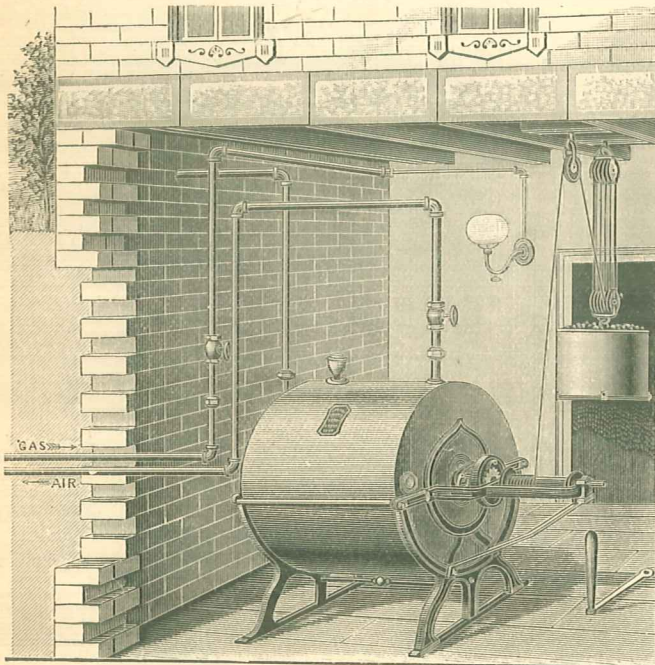
No appurtenance to a building should be more carefully selected than the Gas Machine, for in no branch of machinery are the extremes of good work and poor work so widely separated and so difficult of discernment to the ordinary purchaser.

This is evident when we consider :

*First.* That the Generator is always subjected on the outside to the action of moisture and the alkalis in the earth, and on the inside, to the action of Gasolene and any foreign substances it may contain.

*Second.* That the Air Wheel is operated in water, the parts never being more than partially submerged. It must, therefore, be protected not only from the corrosive action of the atmosphere (especially destructive on thesea-coast), but also from the galvanic action caused by the conjunction of nearly all metals with the acids frequently found in water.

*Third.* That the ordinary pressure upon illuminating gas is from one to three inch water-pressure (less than three ounces to the square inch), and while the Air Pump must be heavy



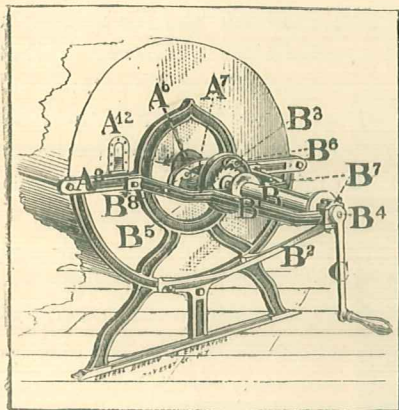
AIR PUMP IN CELLAR.

and strong (for durability), the parts must be so well made and nicely adjusted that this delicate pressure shall be maintained without the slightest variation.

*Fourth.* That, notwithstanding these mechanical difficulties, it is imperatively necessary that the entire Machine shall be so simple that the ordinary house servant can attend to it.

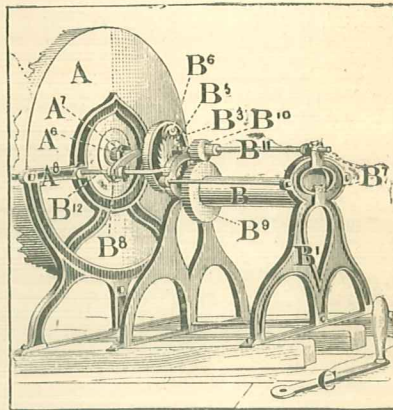
These conditions, therefore, demand in the construction of a good Gas Machine, *first-class work*, simplicity in design and operation, and the use of only such metals as shall stand the various tests to which they are constantly subjected.

FIG. 2



FRONT END OF AIR PUMP SHOWING SIMPLE  
DRIVING MECHANISM USED ON  
SMALLER SIZES.

FIG. 3.



FRONT END OF AIR PUMP SHOWING THE  
COMPOUND DRIVING MECHANISM  
USED ON LARGER SIZES.

The results of our observation and long practical experience are embodied in our IMPERIAL MACHINES.

Our AIR PUMPS are made of hard-rolled copper; all seams riveted and soldered. All the mountings are of brass. The running gear is heavy, well proportioned and highly finished.

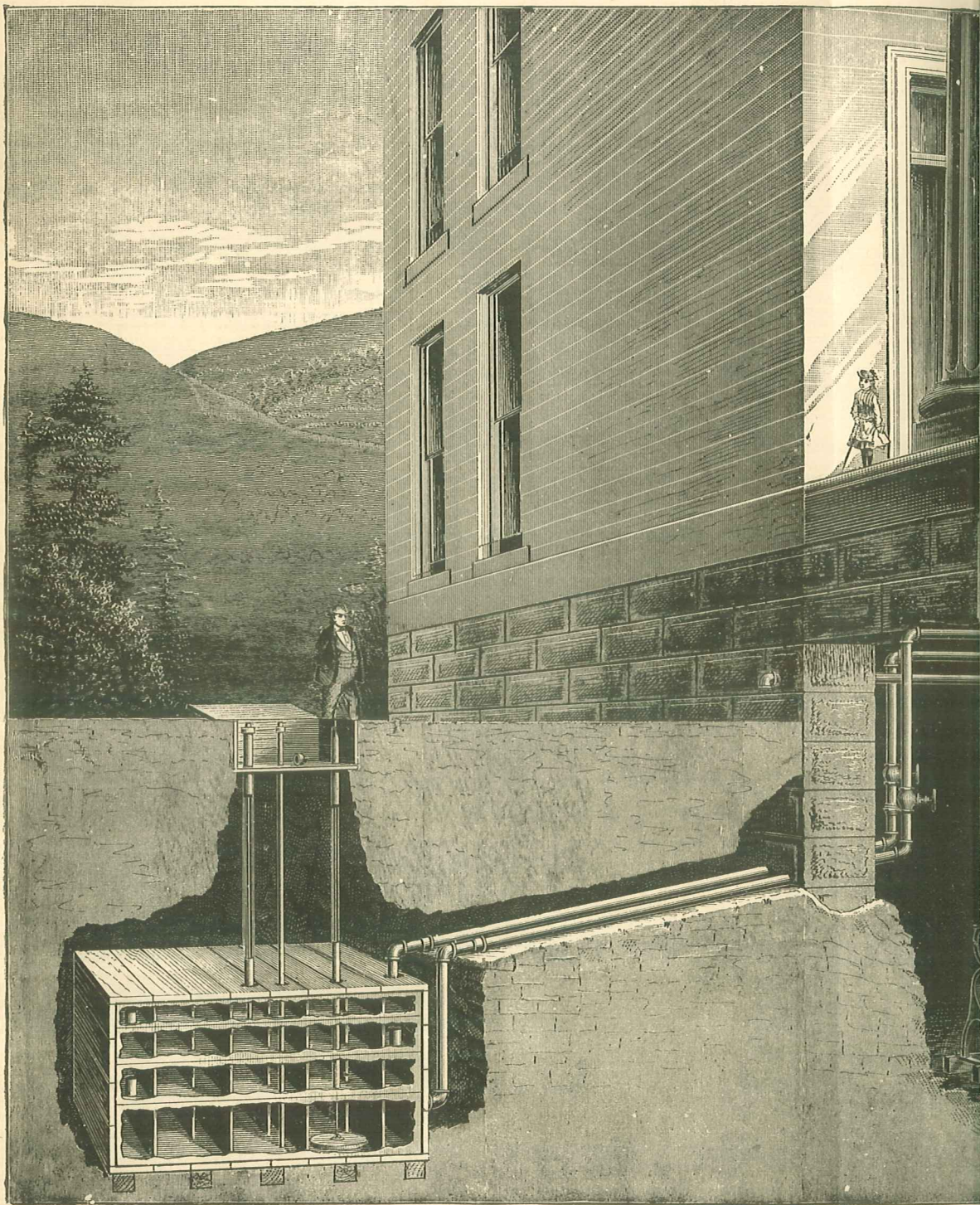
Our GENERATORS are made of heavy galvanized steel (or iron, if preferred) carefully selected, all seams close-riveted and sweated, and the whole covered with a thick coating of asphaltum.

We invite a careful and critical inspection of all parts and features of our apparatus and its comparison with machines of any other manufacture.



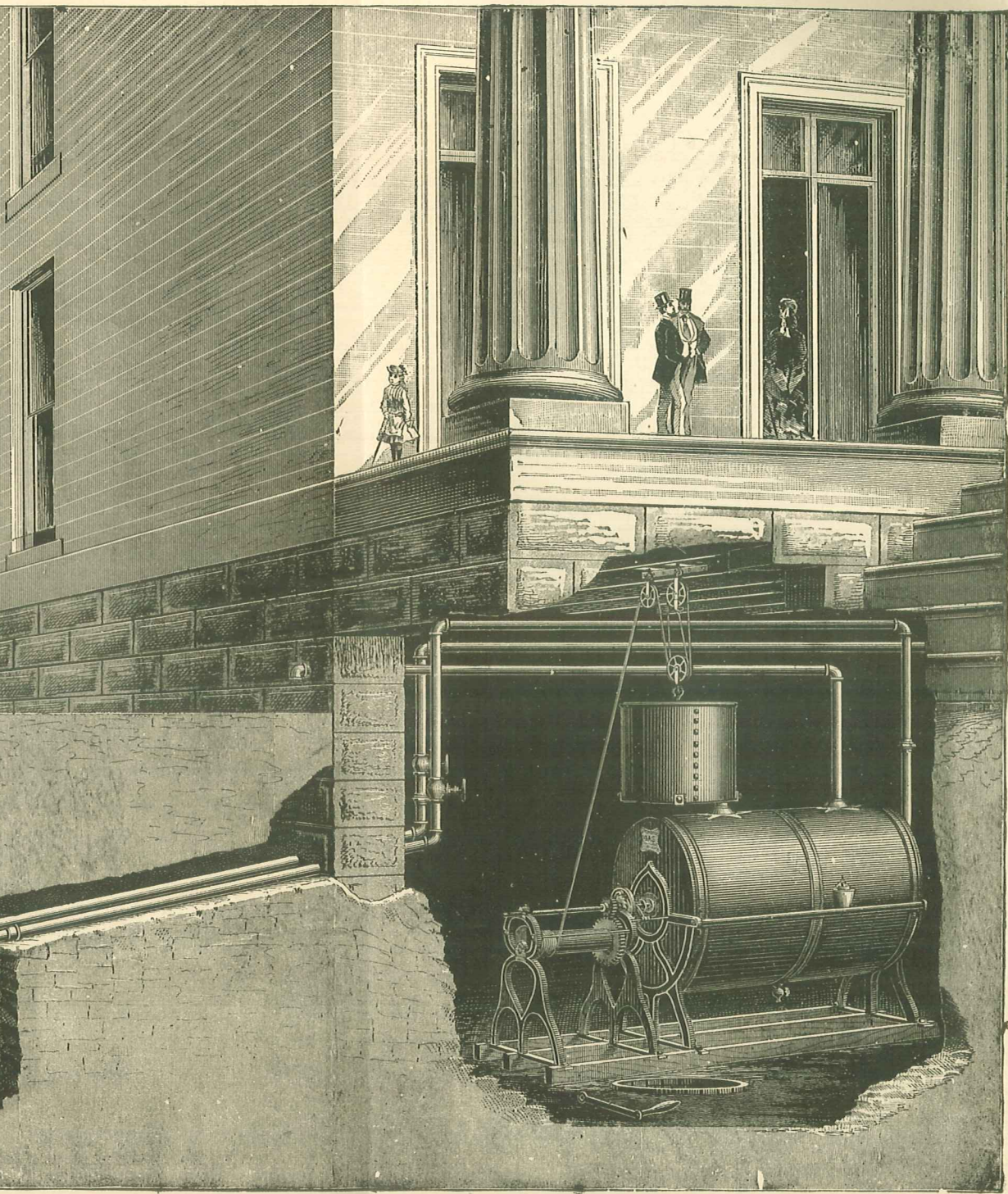


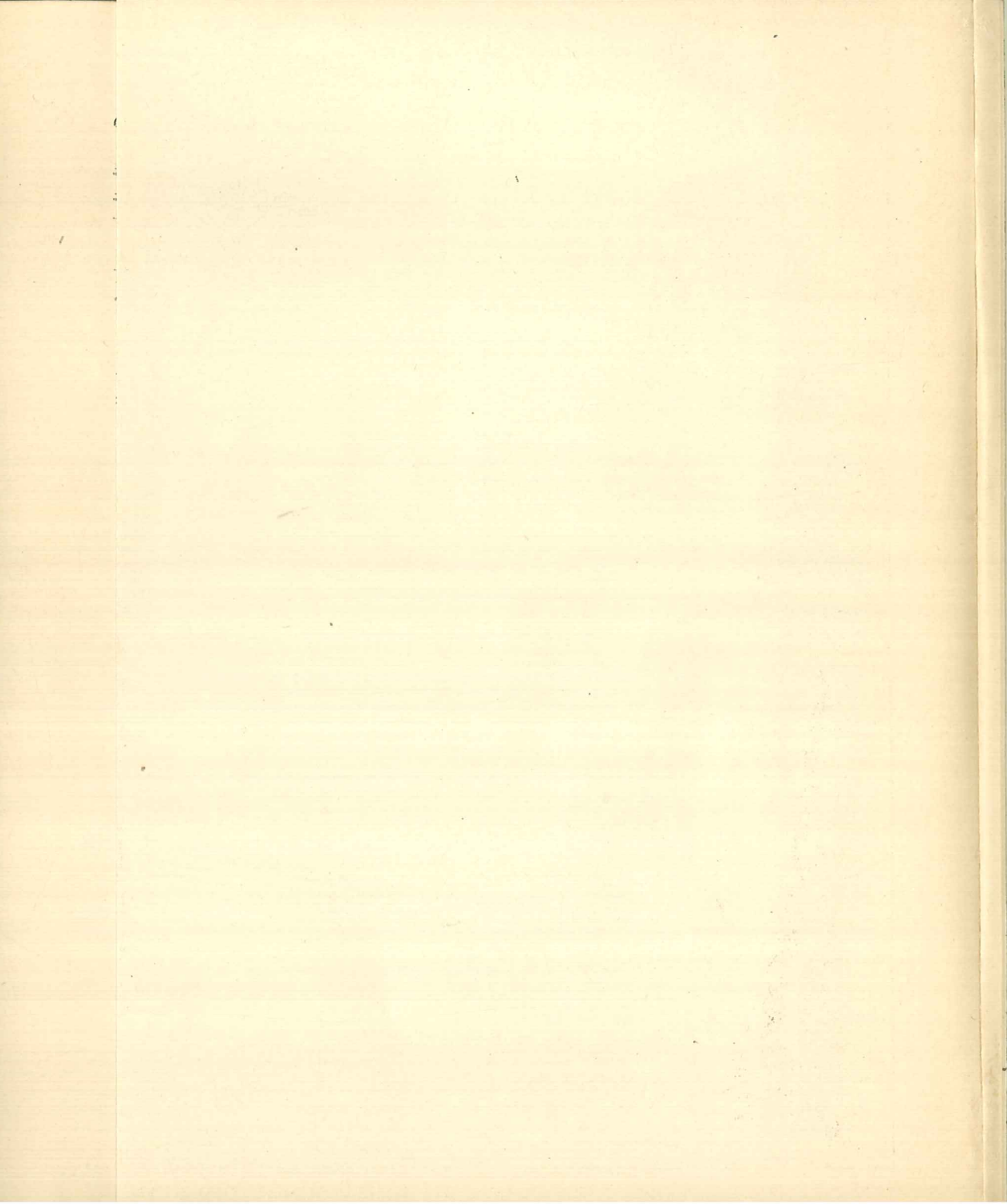




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## DESCRIPTION OF MACHINES.

Full descriptions of our various forms of Machine would occupy too much space, and unnecessarily extend the pages of this pamphlet. The idea that seems to be held by many manufacturers of Gas Machines, that one form or style of Machine, varied only in size, is suitable for all kinds of work, is an error to which may be attributed the frequent failures of Gas Machines to produce the expected results. The fact is, that some kinds of work can be more economically and effectually done by modifications and combinations which it would be folly to use for others.

The *class* of building to be lighted has much to do with the form in which the Machine should be made. The Machine best adapted for a large Mill might be altogether unsuitable for lighting a Church with an equal number of burners; and the surrounding circumstances might require important modifications in a Machine for lighting one Mill or Church which would be perfectly adapted for another of the same size.

For these and many other reasons of a kindred nature, we request that, whenever it is practicable, we may have an opportunity to see the buildings and grounds, or receive otherwise as full information as possible before estimating on work.

*Figure 1* illustrates our Machine as usually made and placed for lighting Residences. The Air Pump is shown in cellar of building, operated by means of weight and pulleys attached to ceiling. The Generator is buried in the earth (at any desired distance), and supplied with Gasolene (once in three to six months) through one of the Pipes running to surface of ground. The Generator has from two to ten compartments (as illustrated in Fig. 5), the number of compartments depending upon the number of burners to be lighted. The *operation* consists in the Air Pump taking common air from outside the building through an Induction Pipe, and forcing it (by means of the weight) through the Syphon Pipe out to the Generator; thence through the meshes of evaporating material in the passages of Generator to the Exit Pipe. By this time the air is thoroughly impregnated with the carbonaceous vapors of the Gasolene, and passes (under the same pressure) through the main Gas Pipe to the house, and thence to the burners. In one of the Pipes running from Generator to surface of ground is a brass rod, attached to a

float in Generator, so that the quantity of Gasolene on hand may at any time be ascertained by removing the Cap from top of said Pipe.

Figure 5 represents one of our "Underground" Generators, with the front end and part of the top removed, so that the inside arrangement may be seen. It is divided horizontally into a series of reservoir chambers, varying in depth from four to fourteen inches. These reservoirs or pans are divided into narrow passages, in which are arranged the meshes of Carbureting material. The Gasolene is supplied to the top pan through a pipe running to surface of ground (see Fig. 4), and after rising to the height of overflow tube in upper left

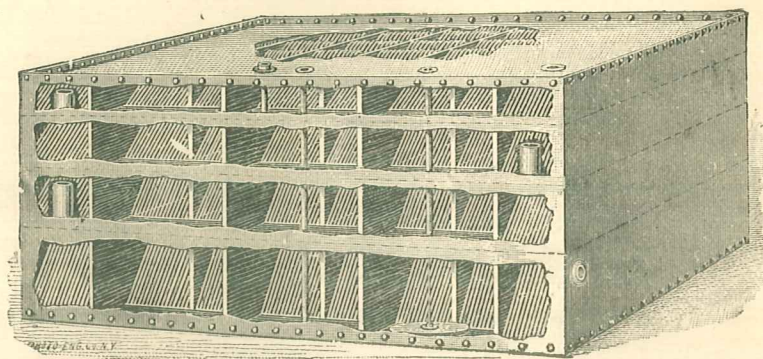


FIGURE 5.—UNDERGROUND GENERATOR.

hand corner, runs over into the second pan, thence into the next, and so on until all the upper pans are nearly full and the Float Wire (see Fig. 4) indicates that a sufficient quantity is in the *bottom pan*.

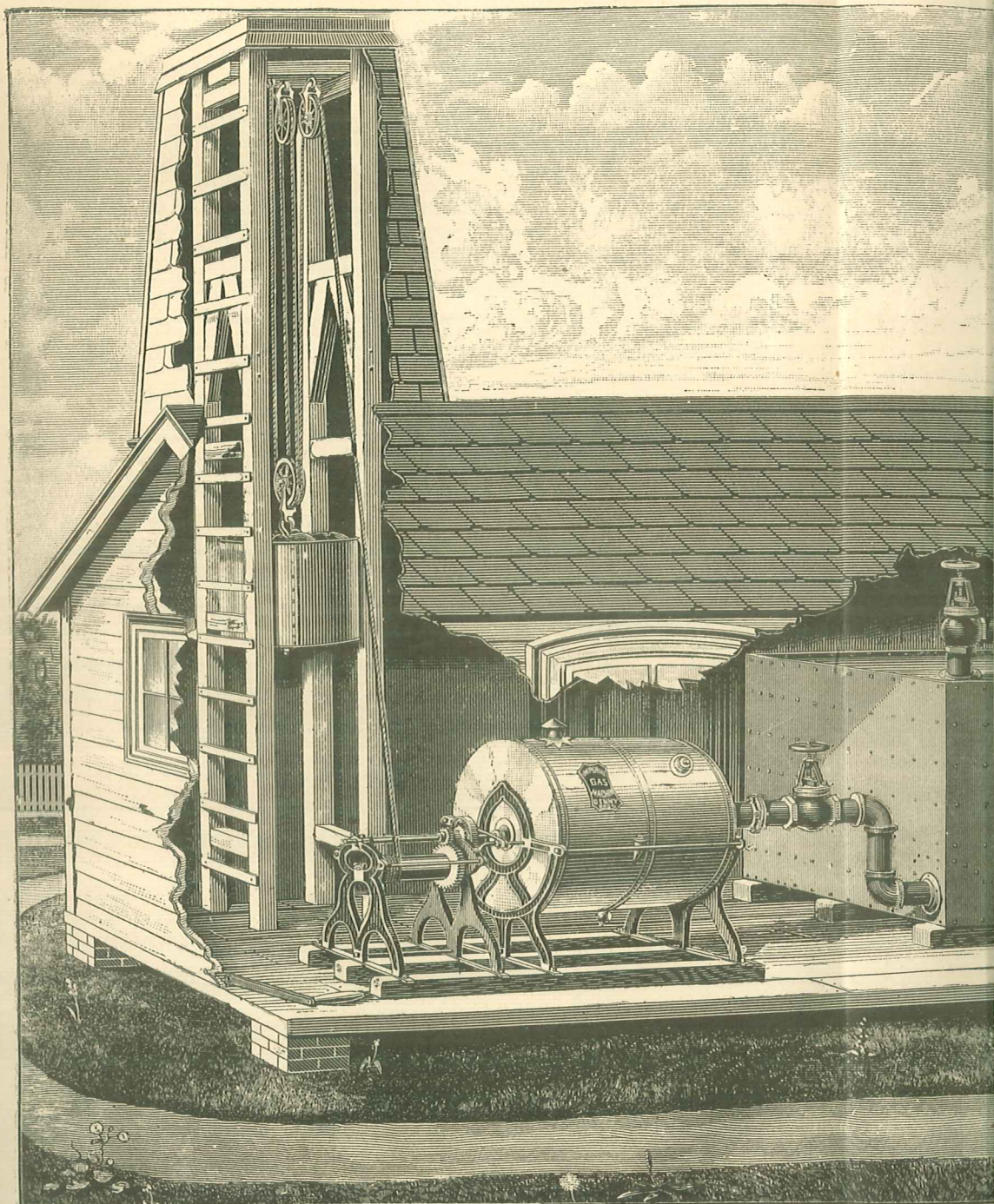
It is in this vessel that the Gas is made. The air, entering the right hand passage of lower pan, above the Gasolene level, is forced through all the meshes of Carbureting material in each successive passage of all the pans, thus becoming thoroughly mixed or impregnated with the vapors of the Gasolene before reaching the Gas exit in right hand passage of the top Pan.

We call especial attention to the following peculiar features of our "Underground" Generator.

*First.* It will be noticed that the Reservoir Pans are of unequal depth, the deepest being at the bottom and the shallowest at the top. The object of this is to insure a uniform consumption of the Gasolene. The air from Air

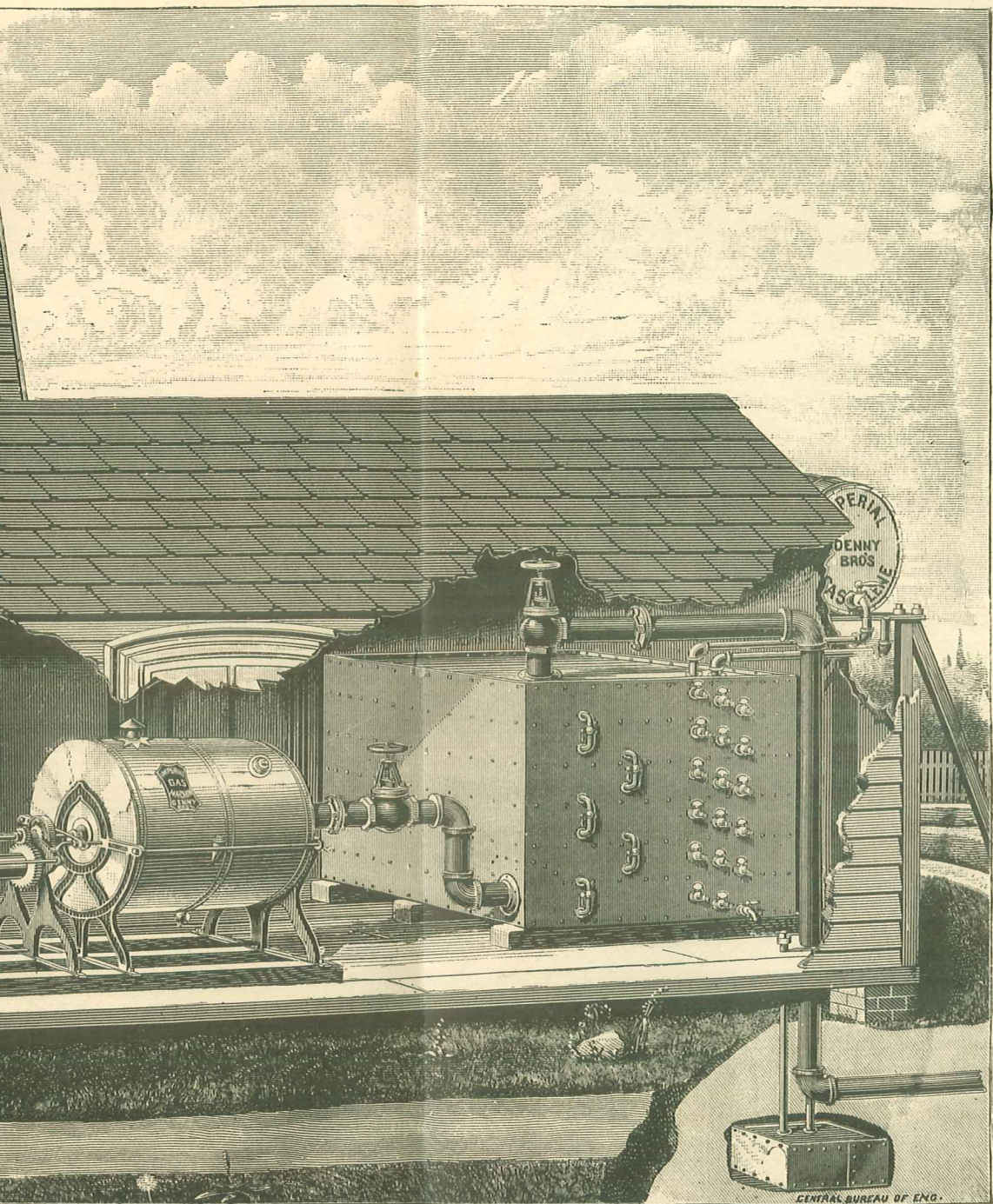






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FIGURE 6.





Pump enters the bottom pan and passes out the top pan. In *any* Generator, made with a series of Reservoir Pans, one above the other, the quantity of Gasolene taken from the several Pans will be in proportion to their proximity to the air entrance, the greatest quantity being taken from the bottom Pan and the least quantity from the top Pan.

The advantage of our arrangement is obvious. So long as any Gasolene remains in the Generator it is equally distributed in the several pans, thus ensuring greater efficiency than if the pans were of equal depth, in which case the lower pans would be empty (and of no value) long before the upper pans.

*Second.* It will be noticed that our Generator is *square*. The advantage of this is *strength*. In all Pan Generators the passages are made of wood. In a *round* Generator the wood-work adds no strength to the sides thereof. In a *square* Generator, the sides as well as the top and bottom are lined with wood-work, which, braced by the partitions, makes a most substantial machine.

*Third.* Our Generator is made to *bury in the ground*. It has no valves or other movable parts except the float for indicating the quantity of Gasolene.

*Fourth.* It is not simply a Reservoir. Every inch of space is filled with Carbureting material, the exposure of which is increased as the Gasolene is used, thereby securing a more even quality of gas than with any other Generator yet produced.

A practical advantage resulting from the above mentioned "special features" of our Generator is that, unless they are used far beyond their rated capacity, there is no residuum—all the Gasolene is used up.

*Figure 6* illustrates our Machine as frequently placed for large work. The entire Machine is placed in a Gas House, which may be located at any convenient point on the premises, and the Main Gas Pipe run in any direction to the building or buildings to be lighted.

The Gas House is usually built with a Tower, as shown, for the purpose of providing a sufficient "fall" for the Weight. The Air Pump is shown with Compound Gear, but whenever a supply of Water can be obtained, the Tower, Compound Gear, Weight and Pulleys may be dispensed with and the Water Motor used, as shown in *Fig. 7*.

The *Generator* shown in *Fig. 6* is designated the "Overflow-Pan" Generator, while those shown in *Figs. 1, 4 and 5* are styled "Underground" Gener-



ators. The distinguishing feature of the "Overflow-Pan" Generator consists in an arrangement of overflow Cocks, by means of which the Gasolene may be transferred from the upper to the lower pans before each filling, thus compelling the Air from Air Pump to operate first upon the older Gasolene in lower pans and then upon the fresh Gasolene in the upper pans.

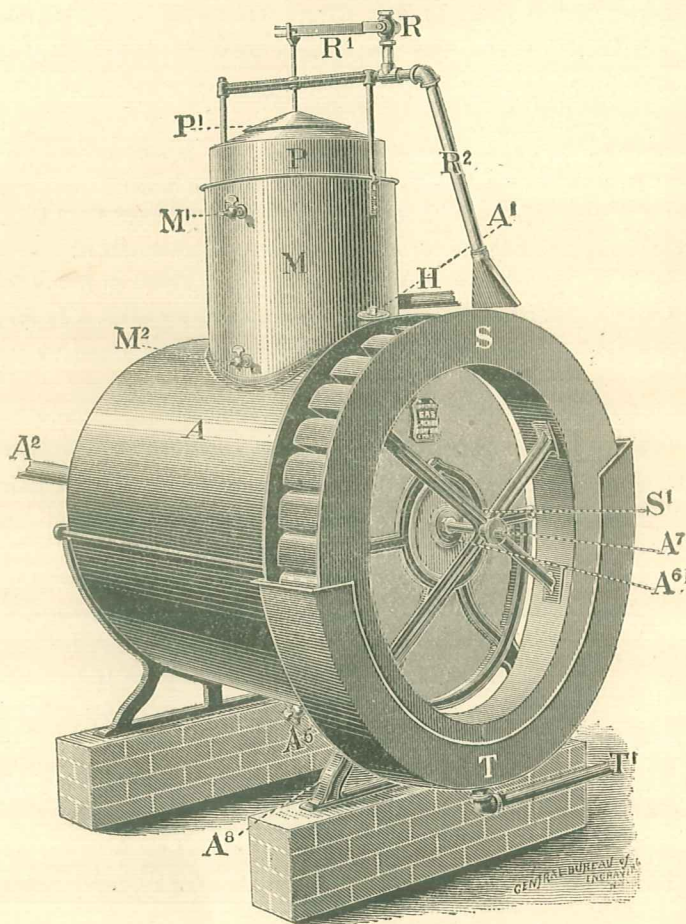


FIGURE 7.—IMPERIAL AIR PUMP WITH WATER MOTOR.

We make the "Overflow-Pan" Generator to supply from two hundred burners up. They cost about 10 per cent. more than the "Underground" Generator, but in many cases, where a large quantity of Gas is to be used, the advantages gained will more than compensate for the slight additional cost.

Another way of placing this style of Generator is shown in

*Figure 8*, which illustrates the "Overflow-Pan" Generator partly buried in the earth, one end of it projecting into a vault. When the Generator is thus placed the Air Pump may be located at any convenient point in the building lighted or in an out-building.

The "Over-flow Pan" Generator is peculiarly adapted for the use of steam, when it may conveniently be had, for re-supplying the heat taken off by the process of evaporation.

*Figure 7* is an illustration of our Air Pump so arranged as to be operated by an overshot Water Wheel, the usual running Gear, with Weight and Pulleys, as shown in other illustrations, being dispensed with.

The Water Wheel, "S," is fastened to shaft of Air Pump. The Valve, "R," is connected with a water supply pipe, and, when open, admits the water through Pipe, "R<sup>2</sup>," to the buckets of Wheel. The weight of water is sufficient to operate the Air Pump, which discharges its air into the Omer, "P." As the Omer rises, the Valve, "R," is closed by means of Lever, "R<sup>1</sup>," thus stopping the flow of water. The usual pipe connections being made between Outlet "H" and the Generator, and thence to the Gas Pipes in building, the pressure in Omer, "P," is communicated to the Generator and all connecting pipes, and the Omer will remain elevated until the pressure is reduced by turning on the lights. Then, as the Omer falls, the Water Valve is opened (by Lever "R<sup>1</sup>"), and just enough water is supplied to the Wheel, "S," to maintain the pressure for the number of burners that are lighted. When all the burners are closed, the Omer again rises and cuts off the supply of Water.

After the water has done its work, it is discharged through Waste Pipe, "T<sup>1</sup>," and may be used for Laundry or other purposes.

This attachment is perfectly automatic in its operation; requires no attention; it is thoroughly effective and reliable.



## SAFETY.

The question naturally arises with those who have not examined the subject, "Is there any danger to be apprehended from using a Gas Machine?" Experience has clearly demonstrated the fact that a good Gas Machine, properly set up, is equally *as safe as the use of the ordinary Coal Gas in cities*, than which there is no safer method of illuminating buildings. There can be no question as to the safety of using gas delivered through permanent pipes and fixtures. The only *possible* danger is from handling the Gasolene; if this were done in the building, the escaping vapor might combine with the air and form an explosive gas, the same as if a defective meter or gas-pipe should leak. Therefore, Gasolene should never be handled or stored in the building.

With the IMPERIAL, the Gasolene is always handled in the open air, where any vapor arising harmlessly passes off, and it is stored outside of and at any desired distance from the building. Nothing enters the building except the Gas as manufactured passing through the pipes.

It will be observed that our Machine is *Automatic* in its operation; there is no Gasometer; no supply is kept on hand; the Gas is made just as it is used, whether for one burner or for the whole number for which the machine is rated.

We insert the following letter from the National Board of Fire Underwriters, by which it will be seen that our Machine is endorsed (for safety) by the highest authority:

COMMITTEE ON PATENTS, GAS MACHINES AND CARBURETERS,

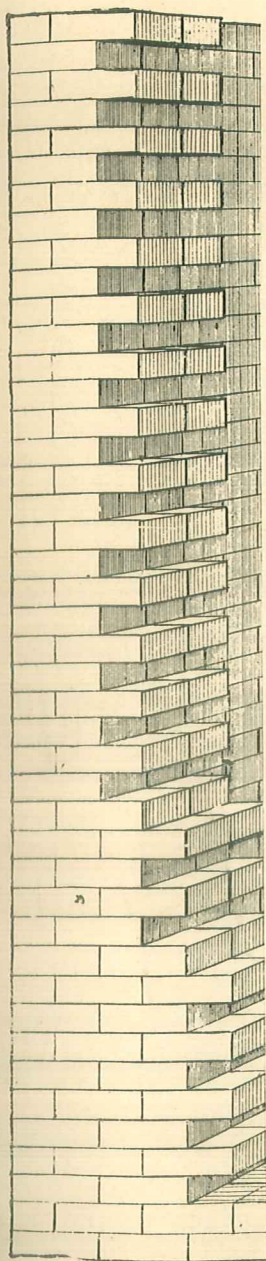
OFFICE OF

THE NATIONAL BOARD OF FIRE UNDERWRITERS,  
NEW YORK.

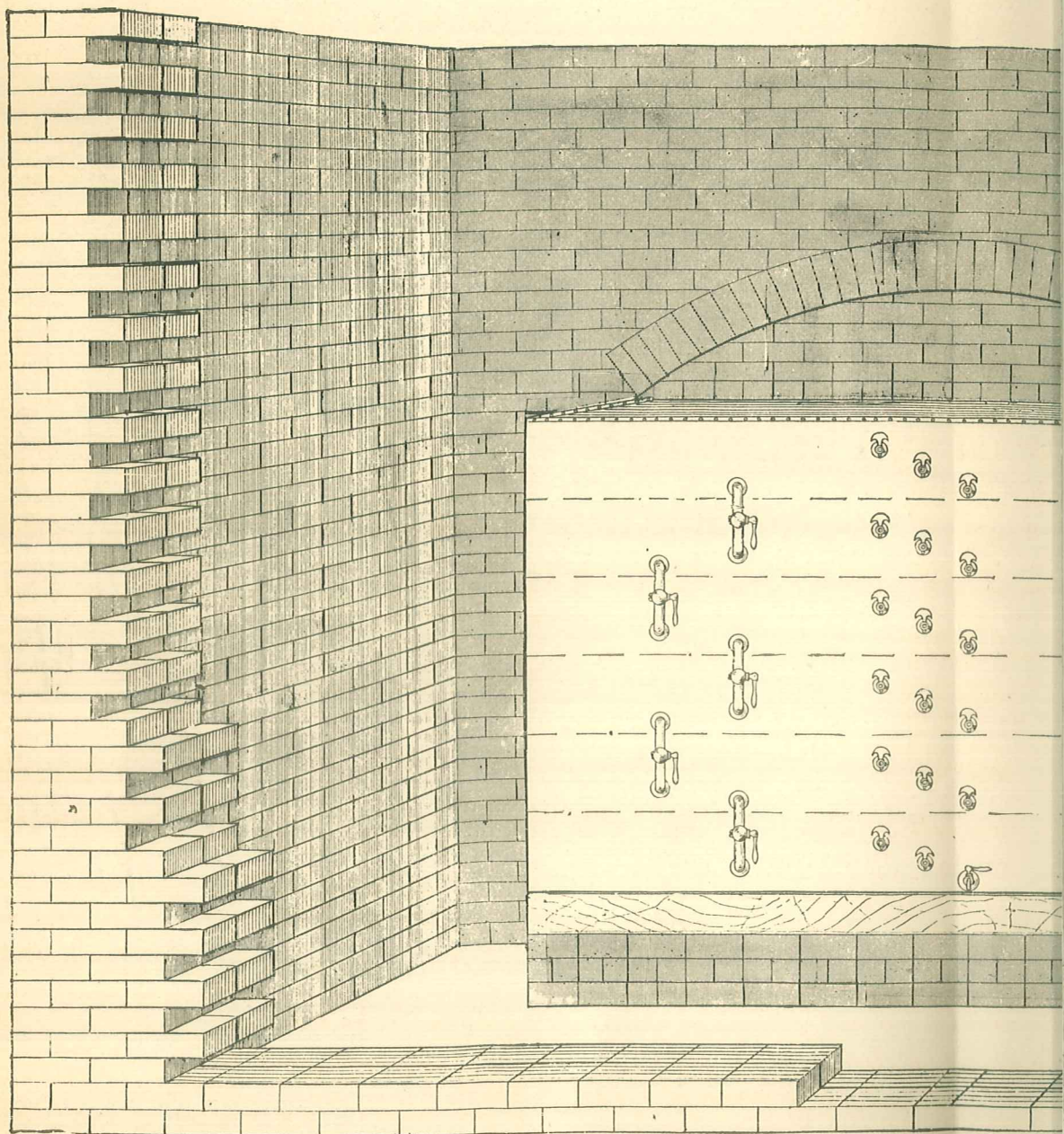
MESSRS. DENNY BROS.

*Gentlemen:* Denny's Imperial Gas Machine, as submitted by you, has been carefully examined by the inspector appointed for that purpose. Its construction as set forth in the accompanying drawings, and its use in accordance with the rules prescribed for all Air Carbureters, have been approved by the committee of the New York Board of Fire Underwriters having in charge the matter of Gas and Gas Machines, and by virtue of such approval are approved also by this committee under the conditions referred to.

HENRY H. HALL, *Chairman.*

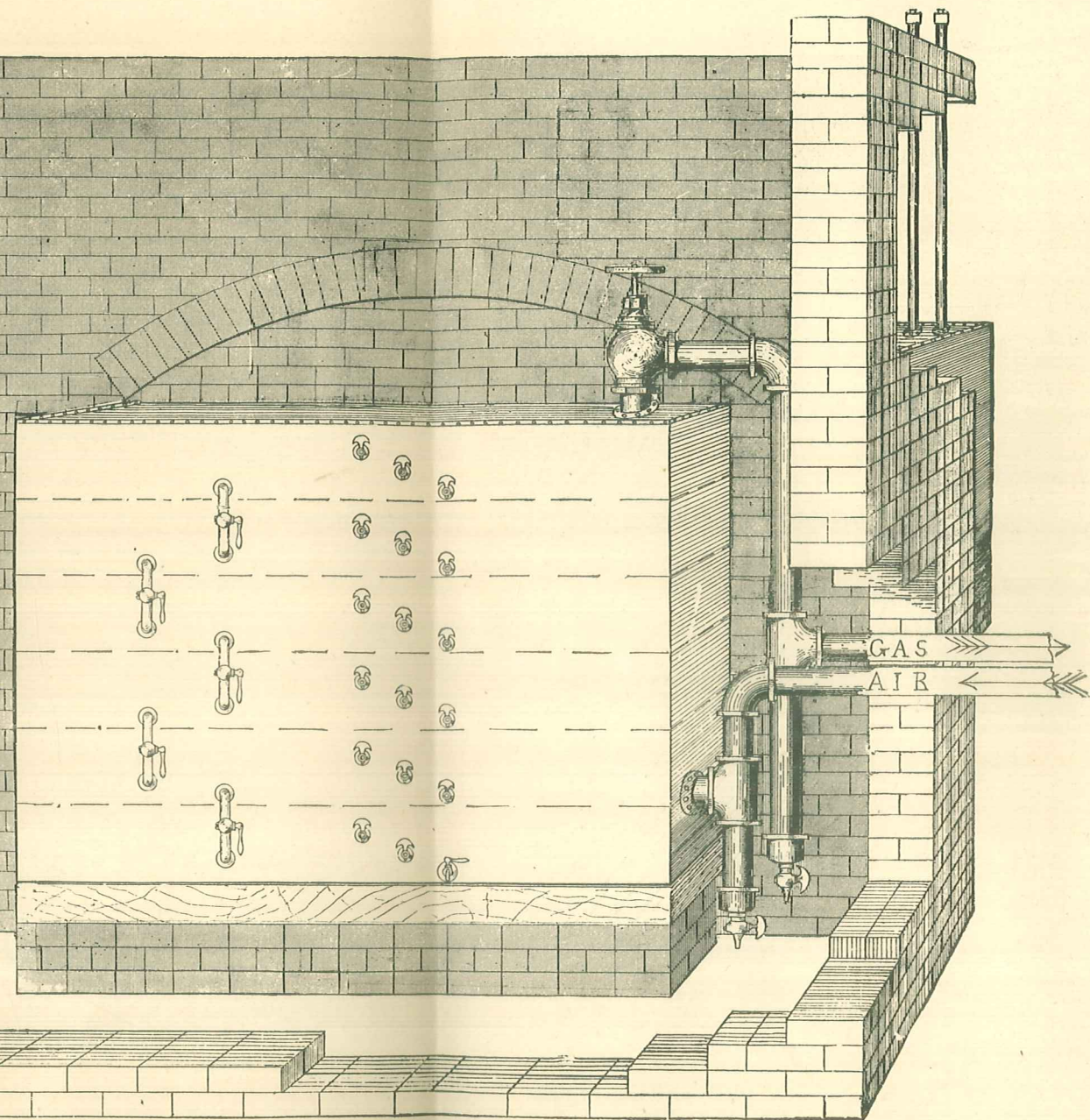






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FIGURE 8.





## SIMPLICITY AND RELIABILITY.

A Gas Machine to be reliable *must* be simple, especially so if it is to be attended to by the gardener, or an ordinary laborer, as is so generally the case in lighting Country Residences. We call particular attention to this feature of the IMPERIAL; *it is so simple that the smallest possible amount of intelligence is requisite in the person who has it in charge.* After the Machine is placed and connected, ready for operation, no other attention is necessary than to wind up the weight occasionally and fill with Gasolene three or four times a year.

When the purchaser is within reasonable distance, we usually set the Machine ourselves, sending competent mechanics for that purpose. In cases where the distance is too great to send our own employees, we send printed instructions, by following which any competent gas-fitter or machinist can properly set the Machine.

Thousands of these Machines are now in use in all parts of the United States and other countries, lighting Public Buildings, Churches, Railroad Depots, Hotels, Mills, Factories, Residences, etc., ranging in capacity from 20 to 2,000 burners, and in every case giving perfect satisfaction.

## THE RATING OF MACHINES.

There is no invariable rule by which to determine the number of burners that a Machine will supply. The rating is entirely arbitrary with each manufacturer. One may rate a Machine with a Pump and Generator of a given size as a 100-light Machine, while another may rate the same size Machine as a 50-light. This fact accounts, to a great extent, for the comparatively cheap prices at which some Machines are offered.

It is our constant purpose and determination to have every Machine we place give unqualified satisfaction. We have, therefore, *rated* the IMPERIAL MACHINE low enough to *insure* a good light for the full number of burners stated. Our Air Pumps will deliver more air at each revolution and maintain a greater pressure than those of any other make. Our Generators have a Gasolene capacity as great and a Carbureting surface at least one-third greater than any other on the market.

## MILL LIGHTING.

For lighting Mills and Factories, where the Gas is required only while the machinery is in motion, the Air Pump and all its attachments may be entirely dispensed with, and the supply of air taken from the Forge Blower (if one is used), or a separate Blower may be connected with the shafting and used exclusively for this purpose. This is a most economical and effective plan. Drawings will be furnished to parties who may desire to consider this method of lighting their buildings.

## FOR MECHANICAL AND HEATING PURPOSES.

The Gas made by our Machine may be used equally as well as Coal Gas for all Mechanical and Heating purposes—as in Burnishing Machines, Stamp-ing Dies, Gas Stoves, Gas Log Fires, etc.

In private residences our Machine may be used for lighting, heating and cooking, and no coal required except in very cold weather.

In factories where metals are brazed or soldered, it can be used with but little more expense than charcoal, and with far greater convenience and dispatch. It is cleanly; always ready for use; produces instantly an intense heat, which can be as quickly diminished or extinguished. It is much safer than charcoal fires.

It is also adapted for Heating purposes in Restaurants and Hotels, and for all Laboratory uses.

## GAS PIPING.

In the piping of any building, there are a few rules that should be observed, whether Coal Gas or Gasolene Gas is to be used. All Illuminating Gas is subject to condensation—that is, dropping some of its moisture—which will run to the lowest point it can reach. It is therefore important to have all horizontal pipes drip back to the riser. Also, to take all outlets from top or side of horizontal pipes and to take branches for *side-wall* outlets from the horizontal pipes *below* instead of *above* such outlets. It is also important to have the sizes of pipes large enough to insure a good flow of gas to all the burners.



The following scale of sizes has been adopted by the principal Gas Companies and is amply large if faithfully followed, but the Fitter should count for each outlet the number of *burners* it will probably be used for.

Length of run not more than	Size of Pipe.	To supply not more than	Length of run not more than	Size of Pipe.	To supply not more than
20 feet.	$\frac{3}{8}$ inch.	2 burners.	150 feet.	$1\frac{1}{2}$ inch.	75 burners.
30 "	$\frac{1}{2}$ "	4 "	200 "	2 "	150 "
50 "	$\frac{3}{4}$ "	15 "	300 "	$2\frac{1}{2}$ "	250 "
70 "	1 "	25 "	400 "	3 "	350 "
100 "	$1\frac{1}{4}$ "	45 "	500 "	4 "	500 "

## GASOLENE.

Nearly every Gas Machine we sell makes for us a new Gasolene customer. It is to our interest in every way to supply only a first-class article, as the successful operation of a Machine depends so largely upon the quality of the Gasolene; and it is to the interest of our customers to get their Gasolene from us, and hold us responsible for its quality.

This branch of our business has assumed large proportions. Our arrangements with leading refiners are such as to *insure* absolute purity, full measure, and quality in exact accordance with the brand.

We sell in any quantity at refiners' prices. Price lists mailed monthly or whenever changed. All orders promptly filled.

## GAS FIXTURES.

In selecting Fixtures for use with Gasolene Gas, care should be taken to see that all the passages are large enough for an adequate supply, under full pressure, for all the burners.

While with our Machine any of the ordinary Gas Fixtures may be used, the fact that some are better adapted than others for the use of Gasolene Gas, leads us to request the privilege of inspecting such Fixtures as our customers may select and designating the burners suitable for them.

We also furnish and connect Fixtures for our customers and can usually save them a considerable percentage and insure careful attention to all details.

## PUMPING ENGINES.

The Gas made by our IMPERIAL MACHINE can be used for driving any of the Pumping Engines now in use and adapted for running with Gas power. We have put in many of them during the past five years, for lifting and forcing water from wells and cisterns to tanks on upper floors of buildings. Our customers have been uniformly pleased with their convenience, simplicity, safety and economy over the old system of pumping by manual labor.

We are prepared to estimate for this class of work, furnishing the Engines, and making all connections for Gas and Water.

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## MIXERS.

The *latest* improvement in Gas Machines is an attachment for equalizing the quality of the Gas. It is a very desirable and valuable improvement, but is not *essential* to the lighting of a building, as is evidenced by the thousands of buildings satisfactorily lighted by Machines without such attachment. In all such cases, however, the varying quality of the Gas (being richer or poorer in proportion to the quantity and quality of Gasolene in the Generator) has necessitated the use of what is known as adjustable burners, such as the "Argand," "Ring," "Clough," "Cross," and other like burners which can be adjusted from time to time in accordance with the differing qualities of Gas made by the Machine.

Many people are perfectly satisfied with such lighting and do not mind the attention required for adjusting the burners, but it is almost impossible to secure such attention from servants and their negligence is quite sure to result finally in the smoking of ceilings in such rooms as are left to their care. The use of the "Mixer" provides against this contingency. Its office is to intercept the Gas as it comes from the Generator and by mixing more or less air with it reduce it to the quality best adapted for perfect combustion. It

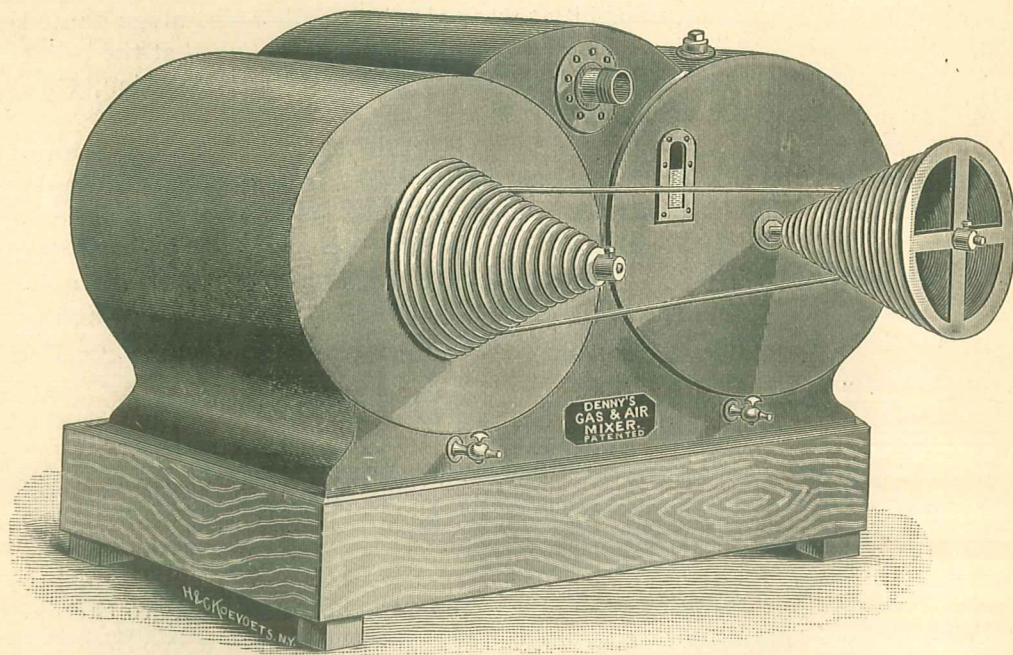


can then be used through non-adjustable burners the same as Coal Gas from city mains and with as little liability to "smoke." Another advantage gained by using a "Mixer" is that the quality of the Gas is maintained at the point which will produce the whitest light and most perfect combustion, thus minimizing the cost of the Gas.

Many attempts have been made during the past few years by manufacturers of the various Gas Machines, to make an attachment for securing a uniform light. Some have failed utterly and others have been *partially* successful. Nearly all these attempts have been in one direction, viz.: "The opening of two adjustable valves by means of a diaphragm arranged to operate in proportion to the quantity of gas consumed; such valves admitting gas and air to a mixing chamber in proportion to the movements of the diaphragm."

Such an attachment, if well made and nicely adjusted, may be successfully operated so long as the Gas Pressure and Air Pressure are perfectly equal *and* a sufficient quantity of gas is being consumed to give a considerable motion to the diaphragm, but these necessary conditions are not *normal* in the operation of a Gas Machine and cannot be maintained. Such apparatus are *unreliable*, causing the pipes at one time to be filled with rich, smoky gas, and at another with pure air, either of which must be let out at the burners, greatly to the annoyance of the consumer.

Our "Mixer" is made on an entirely different principle from anything of the kind heretofore offered to the public. No conditions to which a Gas Machine is subject can in any way affect its continuous and perfect operation. Its motion is *positive* and the mixture of the required proportions of Gas and Air is effected by a *mechanical operation*, governed and controlled by the quantity of gas consumed.



DENNY'S GAS AND AIR MIXER.

### NOTICE THESE "POINTS" ABOUT OUR MIXER.

*First.* It has been in practical use for more than five years, and its uniform success enables us to *guarantee it to do the work at all times and under all conditions.*

*Second.* It is as well-made, consequently as *durable*, as the Gas Machine.

*Third.* It makes a saving of 25 to 50 per cent. in consumption of Gas-olene.

*Fourth.* It is made to comply with all insurance requirements.

*Fifth.* It insures a *clear, brilliant, smokeless* gas-light with open burners.

*Sixth.* It is so simple that *any one* can attend to it.



## DESCRIPTION.

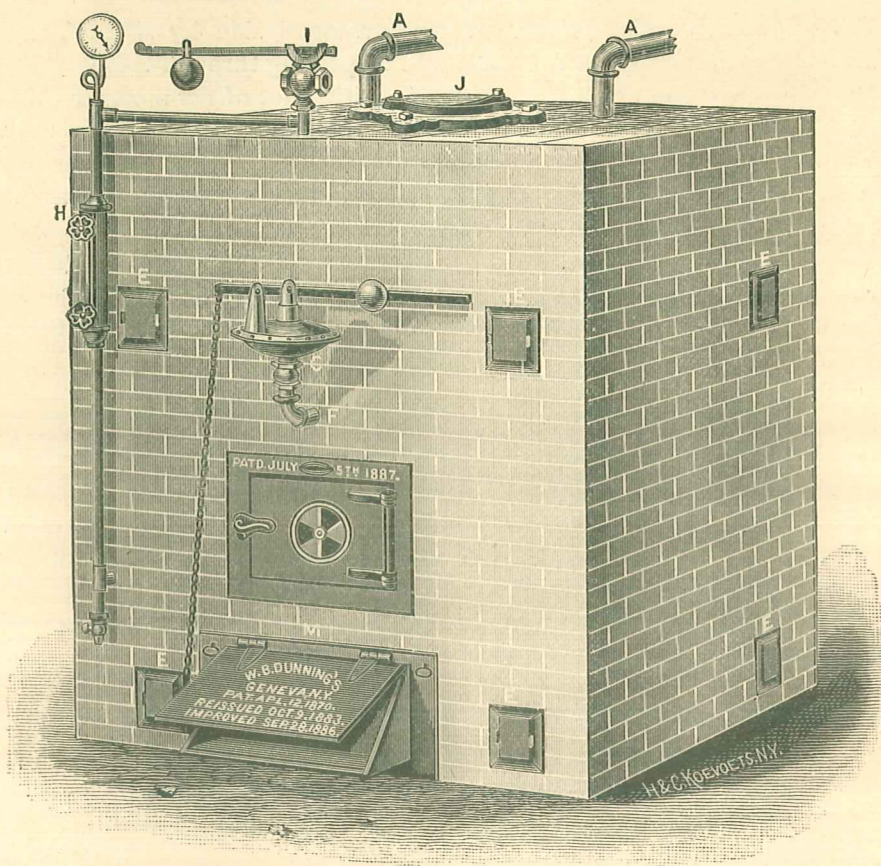
The MIXER consists of two meters arranged side by side. They are operated by the pressure of the Gas and Air passing through them.

The gas pipe from generator connects with inlet of *gas* meter, so that *all* the gas must pass through the MIXER. A branch air pipe is connected with inlet of *air* meter. The meters deliver their gas and air into a common mixing chamber at top of MIXER, whence the mixed (or qualified) gas passes through the pipes to the burners.

The shafts of meters are provided with cone pulleys (grooved as shown in cut) which are connected together by a rubber belt. The relative movement of the meters is determined by the position of the rubber belt on the cone pulleys, and the proportion of Gas and Air passing into the mixing chamber is exactly according to such relative movement of the meters.

When fresh Gasolene is put into the generator, the belt is placed in grooves nearest the MIXER, which makes the movement of the *air* meter much faster than that of the *gas* meter, and secures a mixture of about 10 parts gas to 90 parts air. As the Gasolene is reduced the belt is shifted from time to time, until on the grooves farthest from the MIXER, when the mixture is about 90 parts gas to 10 parts air.

The shifting of belt is all the attention required. It is the work of a moment, and has to be done but three or four times a month.



## THE DUNNING BOILER

FOR WARMING ALL CLASSES OF BUILDINGS BY STEAM OR HOT WATER SYSTEMS.



# THE DUNNING BOILER

*is a regular-made wrought iron tubular boiler, adapted for low-pressure warming purposes, having all the strength and durability of a regular Power Boiler, combined with all those improvements and attachments which insure*

ABSOLUTE SAFETY,

PERFECT RELIABILITY

AND ECONOMY

*in consumption of fuel.*

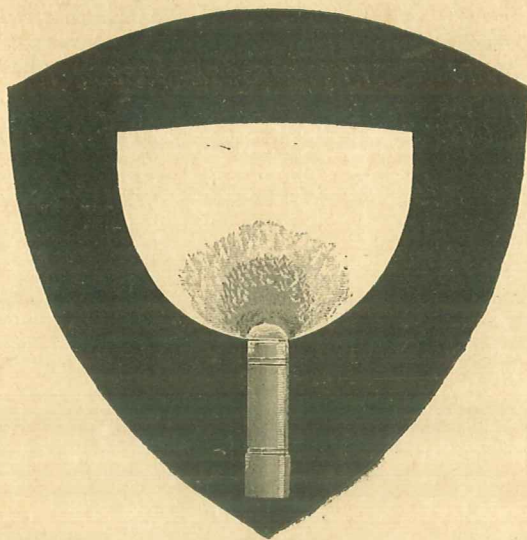
*Parties contemplating the purchase of a Steam or Hot-Water Heating Apparatus will do well to investigate the merits of the DUNNING, made by*

NEW YORK CENTRAL IRON WORKS CO.,

GENEVA, N. Y.

NEW YORK OFFICE,  
36 PARK PLACE.

SEND FOR CATALOGUE.



## DENNY'S IMPERIAL BURNER

FOR USE WITH MIXED GAS

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PRODUCES A STRONG, WHITE, SMOKELESS  
LIGHT.

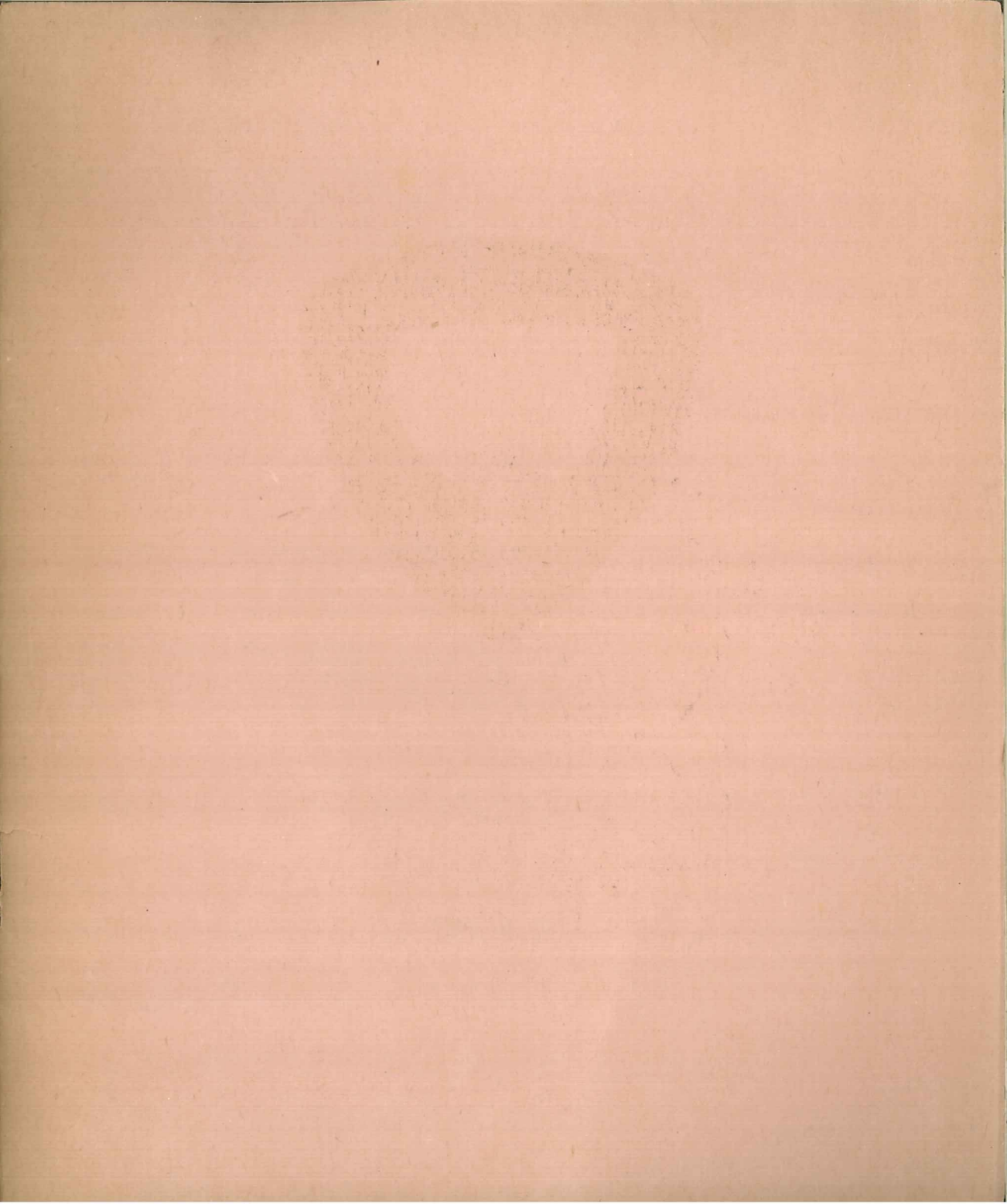
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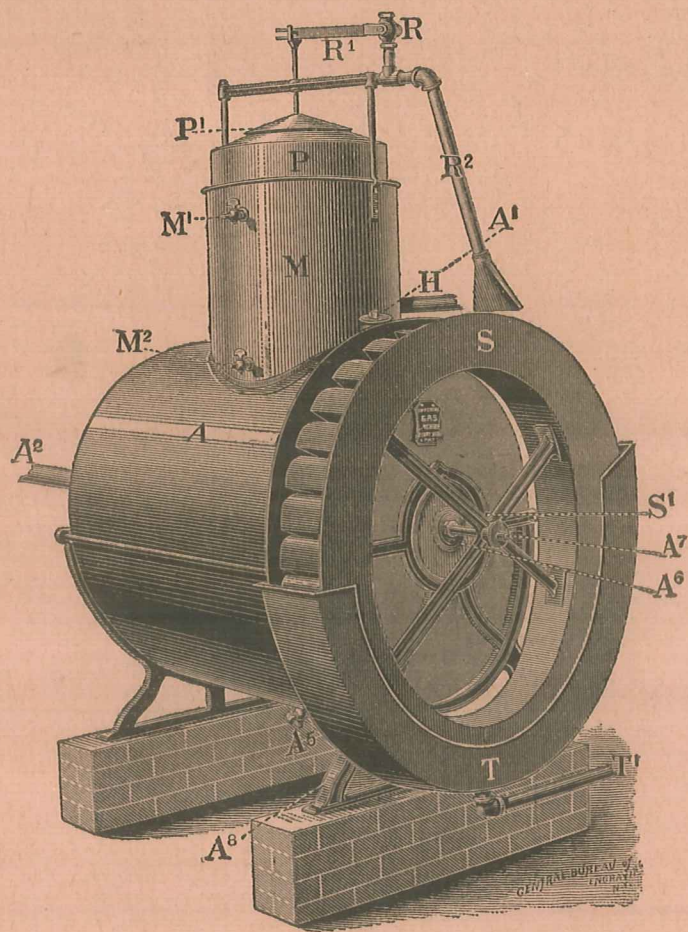
If you have a Gas Machine with Mixer, try  
this Burner.

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Price per gross, net, . . . . . \$36.00







GENERAL BUREAU OF  
 INVENTIONS  
 N.Y.